

Test report No:
70100RRF002

Partial Test report

USA FCC Part 15.247, 15.209

CANADA RSS-247, RSS-Gen

Radio Frequency Devices. Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz.

Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices. General Requirements and Information for the Certification of Radio Apparatus.

(*) Identification of item tested	Roadside sensor for Bluetooth, Bluetooth LE and Wi-Fi tracking
(*) Trademark	trafficnow
(*) Model and /or type reference	DeepBlue v2t
Other identification of the product	Contains FCC ID: 2A3TOTFNDBS01 IC: N/A
(*) Features	Active Bluetooth, passive Rx Only Bluetooth LE, passive Rx only Wi-Fi HW version: TN1.14 SW version: 893_v8
Manufacturer	TRAFFIC NETWORK SOLUTIONS SL C/COMANDANT BENITEZ 25 LOCAL 1 08028 BARCELONA, SPAIN
Test method requested, standard	USA FCC Part 15.247 (10-1-23 Edition): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.209 (10-1-23 Edition): Radiated emission limits; general requirements. CANADA RSS-247 Issue 3 (August 2023). CANADA RSS-Gen Issue 5 amendment 2 (February 2021). Guidance for Performing Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid Systems Devices Operating Under Section 15.247 of the FCC Rules. 558074 D01 Meas Guidance v05r02 dated April 2, 2019. ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	José Manuel Gómez EMC Consumer & RF Lab. Manager
Date of issue	2025-06-11
Report template No	FDT08_23 (*) "Data provided by the client"

Index

COMPETENCES AND GUARANTEES 3

GENERAL CONDITIONS 4

UNCERTAINTY 4

DATA PROVIDED BY THE CLIENT 4

USAGE OF SAMPLES 5

TEST SAMPLE DESCRIPTION 6

IDENTIFICATION OF THE CLIENT 8

TESTING PERIOD AND PLACE 8

DOCUMENT HISTORY 8

ENVIRONMENTAL CONDITIONS 9

REMARKS AND COMMENTS 10

TESTING VERDICTS 10

LIST OF EQUIPMENT USED DURING THE TEST 10

SUMMARY 11

APPENDIX A: TEST RESULT. BT 2.1 BASIC RATE.....12

Competences and guarantees

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification S.A.U. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification S.A.U. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification S.A.U. at the time of performance of the test.

DEKRA Testing and Certification S.A.U. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA Testing and Certification S.A.U.

General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification S.A.U.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification S.A.U. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor $k=2$) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested")
2. The sample consists of a Roadside sensor for Bluetooth, Bluetooth LE and Wi-Fi tracking equipped with an active Bluetooth module and passive (RX only) Bluetooth Low Energy and WiFi modules at 2.4GHz.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples undergoing test have been selected by: The client.

Id	Control Number	Description	Model	Serial N°	Date of Reception	Application
S/01	55208_23	Traffic flow sensor	BC-PLUS	WI133750	2017-10-17	Element Under Test
S/01	55208_25	Traffic flow sensor	BC-PLUS	WI133751	2017-10-17	Element Under Test
S/01	55208_24	Antenna	---	---	2017-10-17	Element Under Test

Test sample description

Test Sample description (compulsory information for EMC and RF testing services)

Ports..... :	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded			
Supplementary information to the ports..... :							
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
		AC:					
		AC:					
		DC:					
	DC:						
Rated Power							
Clock frequencies..... :							
Other parameters							
Software version							
Hardware version							
Dimensions in cm (W x H x D)							
Mounting position		Table top equipment					
		Wall/Ceiling mounted equipment					
		Floor standing equipment					
		Hand-held equipment					
		Other:					
Modules/parts..... :	Module/parts of test item		Type		Manufacturer		

Accessories (not part of the test item):	Description	Type	Manufacturer
Documents as provided by the applicant.....:	Description	File name	Issue date

⁽³⁾ Only for Medical Equipment

Identification of the client

TRAFFIC NETWORK SOLUTIONS SL
C/COMANDANT BENITEZ 25 LOCAL 1 08028 BARCELONA, SPAIN

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2017-09-20
Date (finish)	2017-11-20

Document history

Report number	Date	Description
70100RRF.002	2025-06-11	First release.

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %
Shielding effectiveness	> 100 dB
Electric insulation	> 10 k Ω
Reference resistance to earth	< 1 Ω

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 k Ω
Reference resistance to earth	< 1 Ω
Normal site attenuation (NSA)	< ± 4 dB at 10 m distance between item under test and receiver antenna, (30 MHz to 1000 MHz)
Field homogeneity	More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 1000 MHz).

Remarks and comments

The tests have been performed by the technical personnel: Pedro Parada.

Test not requested. Only radiated spurious emissions tests were requested.

Testing verdicts

Fail	F
Inconclusive	I
Not applicable	N/A
Not measured	N/M
Pass	P

List of equipment used during the test

Description	Last Calibration	Next Calibration
Semianechoic Absorber Lined Chamber ETS FACT3 200STP	N.A.	N.A.
BiconicalLog antenna ETS LINDGREN 3142E	2015/06	2018/06
Multi Device Controller EMCO 2090	N.A.	N.A.
Double-ridge Guide Horn antenna 1-18 GHz SCHWARZBECK BBHA 9120 D	2016/11	2019/11
Broadband Horn antenna 18-40 GHz SCHWARZBECK BBHA 9170	2017/03	2020/03
EMI Test Receiver R&S ESU 40	2016/03	2018/03
Spectrum analyser Rohde & Schwarz FSW50	2015/12	2017/12
RF pre-amplifier 30MHz-6GHz Bonn Elektronik BLNA 0360-01N	2017/09	2018/09
RF pre-amplifier 1-18 GHz Bonn Elektronik BLMA 0118-1M	2016/02	2018/02
RF pre-amplifier 18-40 GHz BONN ELEKTRONIK BLMA 1840-1M	2015/12	2017/12

Summary

Test Specification.	Verdict	Remark
FCC 15.247 Subclause (a) (1) / RSS-247 Clause 5.1 (b) 20 dB Bandwidth and Carrier frequency separation	NM ²	
FCC 15.247 Subclause (a)(1)(iii) / RSS-247 Clause 5.1 (d) Number of hopping channels	NM ²	
FCC 15.247 Subclause (a)(1)(iii) / RSS-247 Clause 5.1 (d) Time of occupancy (Dwell Time)	NM ²	
FCC 15.247 Subclause (b) / RSS-247 Clause 5.4 (b) Maximum peak output power and antenna gain	NM ²	
FCC 15.247 Subclause (d) / RSS-247 Clause 5.5. Band-edge compliance of conducted emissions (Transmitter)	NM ²	
FCC 15.247 Subclause (d) / RSS-247 Clause 5.5 Emission limitations conducted (Transmitter)	NM ²	
FCC 15.247 Subclause (d) / RSS-247 Clause 5.5 Emission limitations radiated (Transmitter)	Pass	
<u>Supplementary information and remarks:</u> 2: See section “Remarks and comments”.		

Appendix A: Test result. BT 2.1 Basic Rate

Appendix A content

TEST CONDITIONS	14
FCC SECTION 15.247 SUBCLAUSE (D) / RSS-247 CLAUSE 5.5. EMISSION LIMITATIONS RADIATED (TRANSMITTER)	17

Test conditions

Power supply (V):

Vnominal = 24.0 Vdc

Type of power supply = External power supply.

Type of antenna: Integral antenna.

Declared Gain (maximum) = +12 dBi. (Antenna gain)

TEST FREQUENCIES:

Lowest channel: 2402 MHz

Middle channel: 2441 MHz

Highest channel: 2479 MHz

RADIATED MEASUREMENTS

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency range 30 MHz-1000 MHz (30 MHz-1000 MHz Bilog antenna) and at a distance of 1m for the frequency range 1 GHz-25 GHz (1 GHz-18 GHz Double ridge horn antenna and 18 GHz-40 GHz horn antenna).

For radiated emissions in the range 1 GHz-25 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

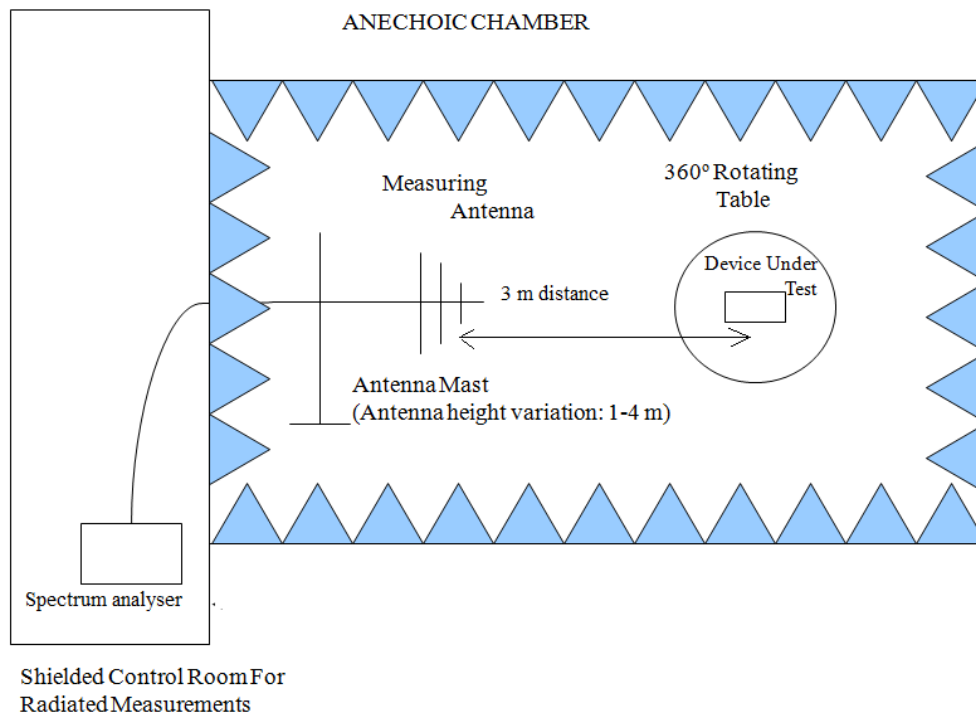
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission.

It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

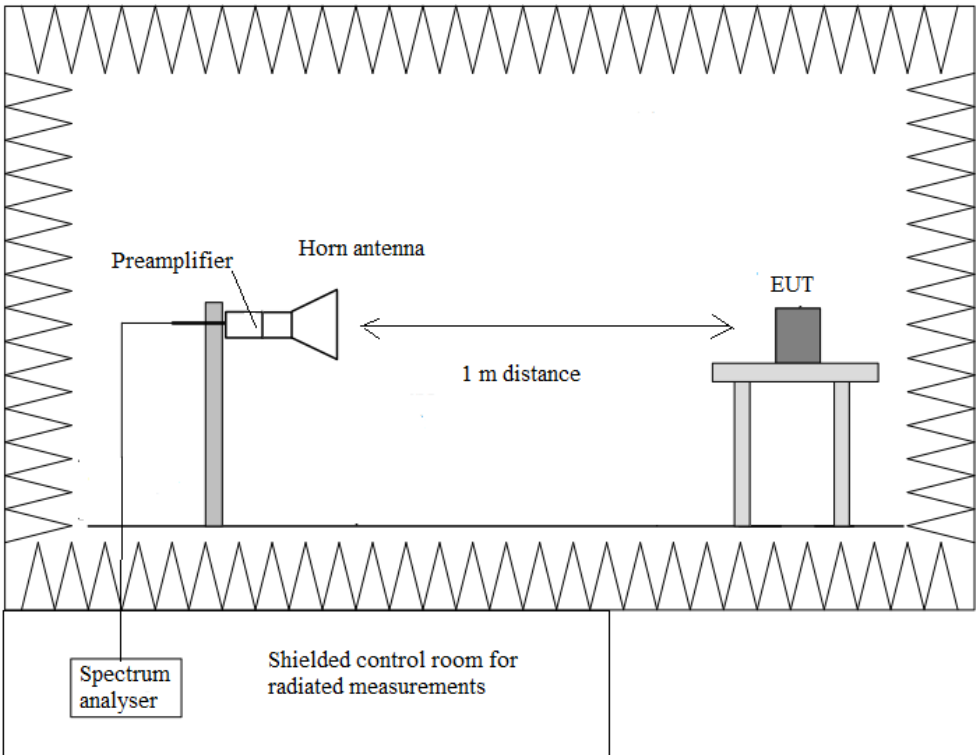
Measurements were made in both horizontal and vertical planes of polarization.

The test was performed with the equipment transmitting first with only the BT 2.1 Basic Rate radio and repeated with the 3G and LTE radios transmitting simultaneously to check the impact of the co-location of the other radio interfaces. The results and plots below show the worst results obtained.

Radiated measurements setup $f < 1$ GHz



Radiated measurements setup $f > 1\text{ GHz}$



FCC Section 15.247 Subclause (d) / RSS-247 Clause 5.5. Emission limitations radiated (Transmitter)

SPECIFICATION

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)/RSS-Gen):

Frequency Range (MHz)	Field strength ($\mu\text{V/m}$)	Field strength ($\text{dB}\mu\text{V/m}$)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RSS-247. Attenuation below the general field strength limits specified in RSS-Gen is not required.

RESULTS:

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

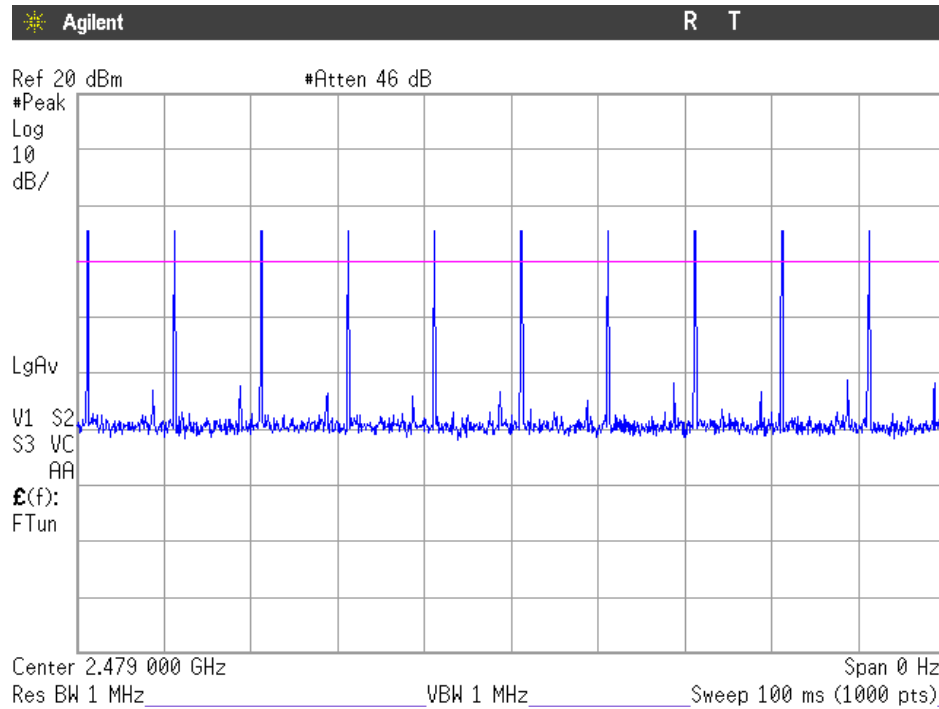
Measurements were made in both horizontal and vertical planes of polarization.

All tests were performed in a semi-anechoic chamber at a distance of 3 m for the frequency range 30 MHz-1000 MHz and at distance of 1m for the frequency range 1 GHz-25 GHz.

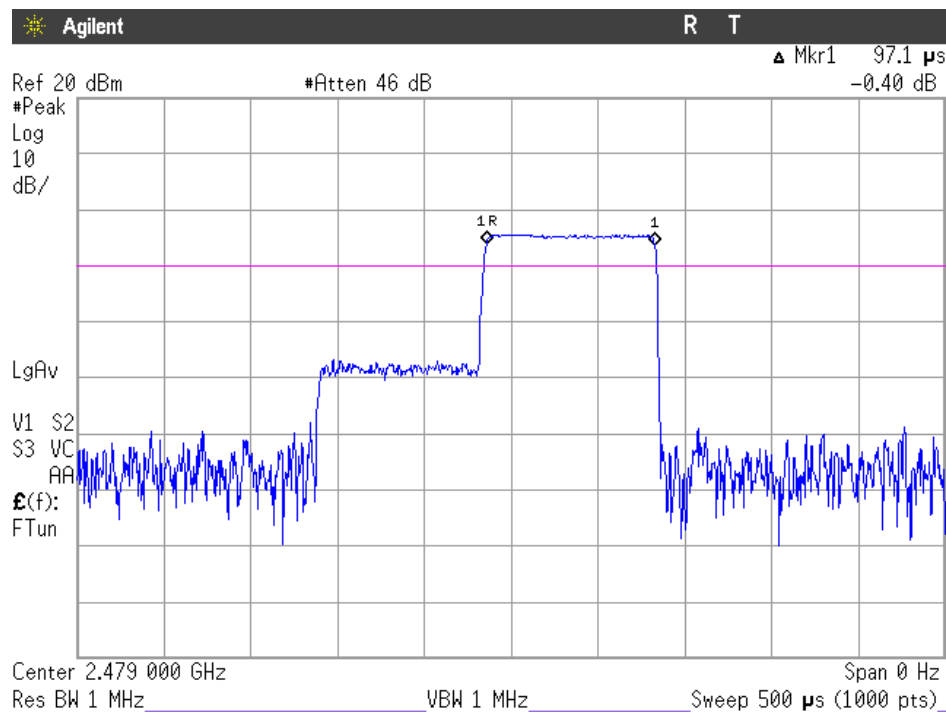
The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

The transmission is pulsed so the average values of transmitter fundamental and spurious emissions are calculated from the measured peak values using the duty cycle correction factor δ as indicated in standard ANSI C63.10-2013.

Computation of duty-cycle correction factor



Number of pulses within 100 ms: 10



Pulse duration (Tx ON): 97.1 μs

Duty cycle correction factor $\delta = 20 * \log (\text{Tx ON (ms)} * \text{Number of pulses within 100 ms}) / 100 \text{ ms}$

$$\delta = 20 \log (0.0971 * 10) / 100 = -40.25 \text{ dB.}$$

Frequency range 30 MHz-1000 MHz.

Note: The spurious emissions below 1 GHz do not depend on either the operating channel in the EUT.

Spurious levels operating (radiated) closest to the limit.

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
40.476	V	Quasi-Peak	29.20	± 3.88
126.806	V	Quasi-Peak	27.70	± 3.88
149.989	V	Quasi-Peak	28.10	± 3.88
212.263	V	Quasi-Peak	24.50	± 3.88
361.691	V	Quasi-Peak	32.90	± 3.88
411.452	V	Quasi-Peak	25.30	± 3.88
450.010	V	Quasi-Peak	26.10	± 3.88
640.275	H	Quasi-Peak	24.80	± 3.88
720.009	H	Quasi-Peak	20.20	± 3.88
822.878	H	Quasi-Peak	19.30	± 3.88

Frequency range 1 GHz-25 GHz

The results in the next tables show the maximum measured levels in the 1-25 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz (see next plots).

1. CHANNEL: LOWEST (2402 MHz).

Spurious frequency (GHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
2.27403	V	Peak	49.79	± 4.87
2.30603	V	Peak	51.49	± 4.87
2.32200	V	Peak	47.87	± 4.87
2.33784	V	Peak	50.82	± 4.87
2.35387	V	Peak	48.08	± 4.87
2.37590	V	Peak	54.91	± 4.87
		AVG (*)	14.66	± 4.87
2.38599	V	Peak	56.43	± 4.87
		AVG (*)	16.18	± 4.87
2.46616	V	Peak	51.05	± 4.87
2.49784	V	Peak	53.47	± 4.87
2.56183	V	Peak	48.46	± 4.87
3.22925	V	Peak	37.81	± 4.87
3.50225	H	Peak	37.23	± 4.87

(*) AVG value was calculated using Duty cycle correction factor δ .

2. CHANNEL: MIDDLE (2441 MHz).

Spurious frequency (GHz)	Polarization	Detector	Emission Level (dB μ V/m)	Measurement Uncertainty (dB)
2.28103	V	Peak	47.13	± 4.87
2.31289	V	Peak	52.70	± 4.87
2.32894	V	Peak	45.69	± 4.87
2.34503	V	Peak	51.44	± 4.87
2.36093	V	Peak	46.44	± 4.87
2.37736	V	Peak	50.58	± 4.87
2.48909	V	Peak	51.24	± 4.87
2.50496	V	Peak	50.19	± 4.87
2.53690	V	Peak	49.31	± 4.87
2.56897	V	Peak	48.83	± 4.87
3.22925	V	Peak	37.51	± 4.87
4.88175	H	Peak	37.40	± 4.87

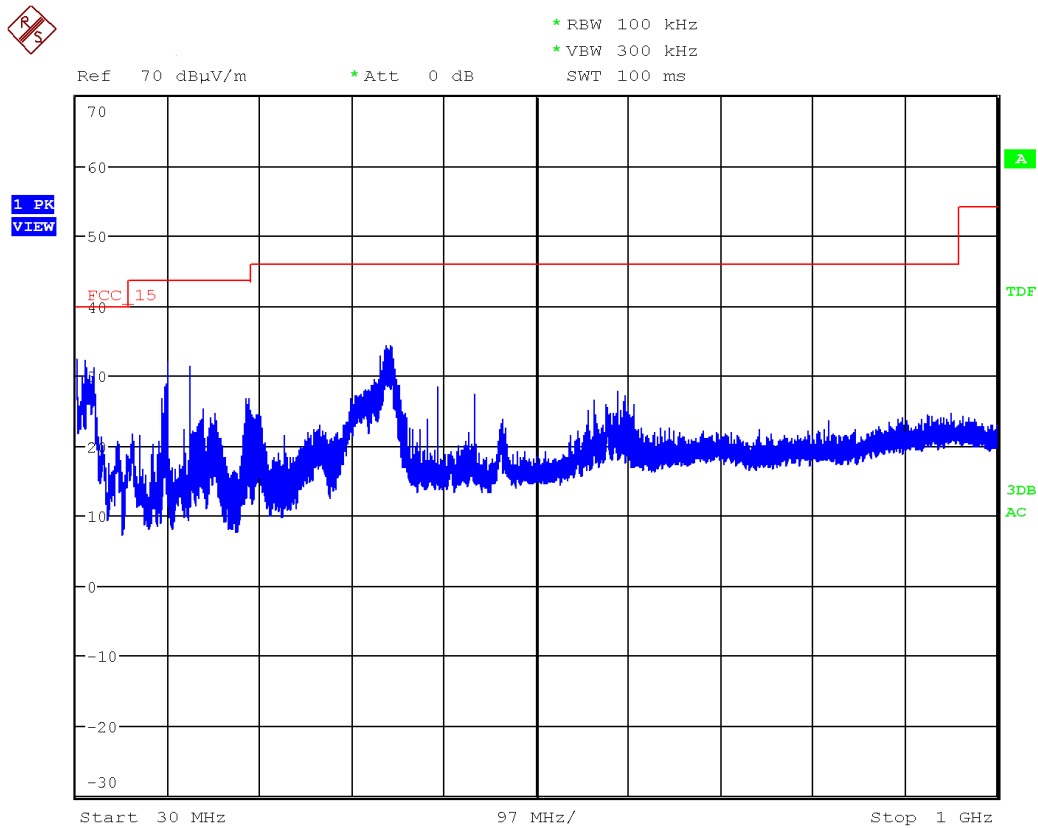
3. CHANNEL: HIGHEST (2479 MHz).

Spurious frequency (GHz)	Polarization	Detector	Emission Level (dBµV/m)	Measurement Uncertainty (dB)
1.74903	V	Peak	42.59	± 4.87
2.28703	V	Peak	47.47	± 4.87
2.31930	V	Peak	50.78	± 4.87
2.33841	H	Peak	48.50	± 4.87
2.35102	V	Peak	51.78	± 4.87
2.38318	V	Peak	52.33	± 4.87
2.48351	V	Peak	67.41	± 4.87
		AVG (*)	27.16	± 4.87
2.48534	V	Peak	50.27	± 4.87
2.49505	H	Peak	57.50	± 4.87
		AVG (*)	17.25	± 4.87
3.22925	V	Peak	37.48	± 4.87
3.50975	V	Peak	36.70	± 4.87
4.95775	H	Peak	38.62	± 4.87

(*) AVG value was calculated using Duty cycle correction factor δ .

Verdict: PASS

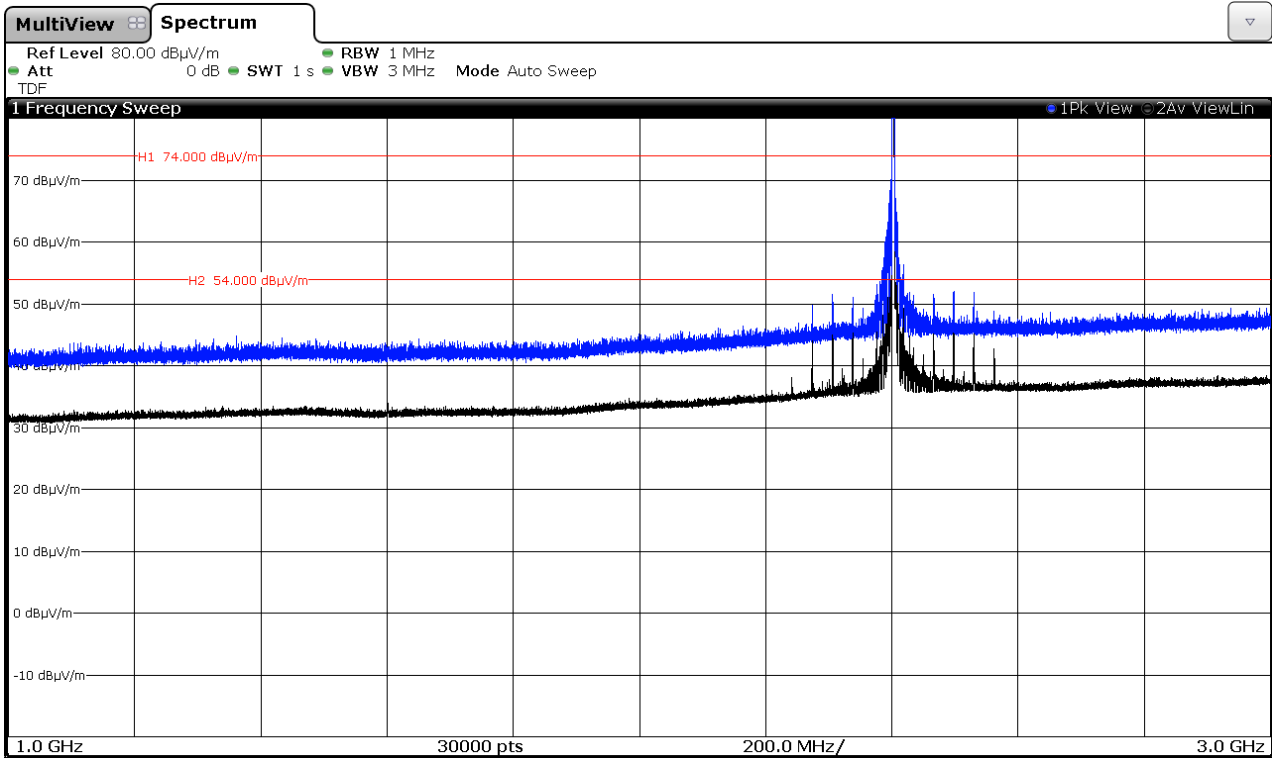
FREQUENCY RANGE 30 MHz-1000 MHz.



(This plot is valid for all three channels).

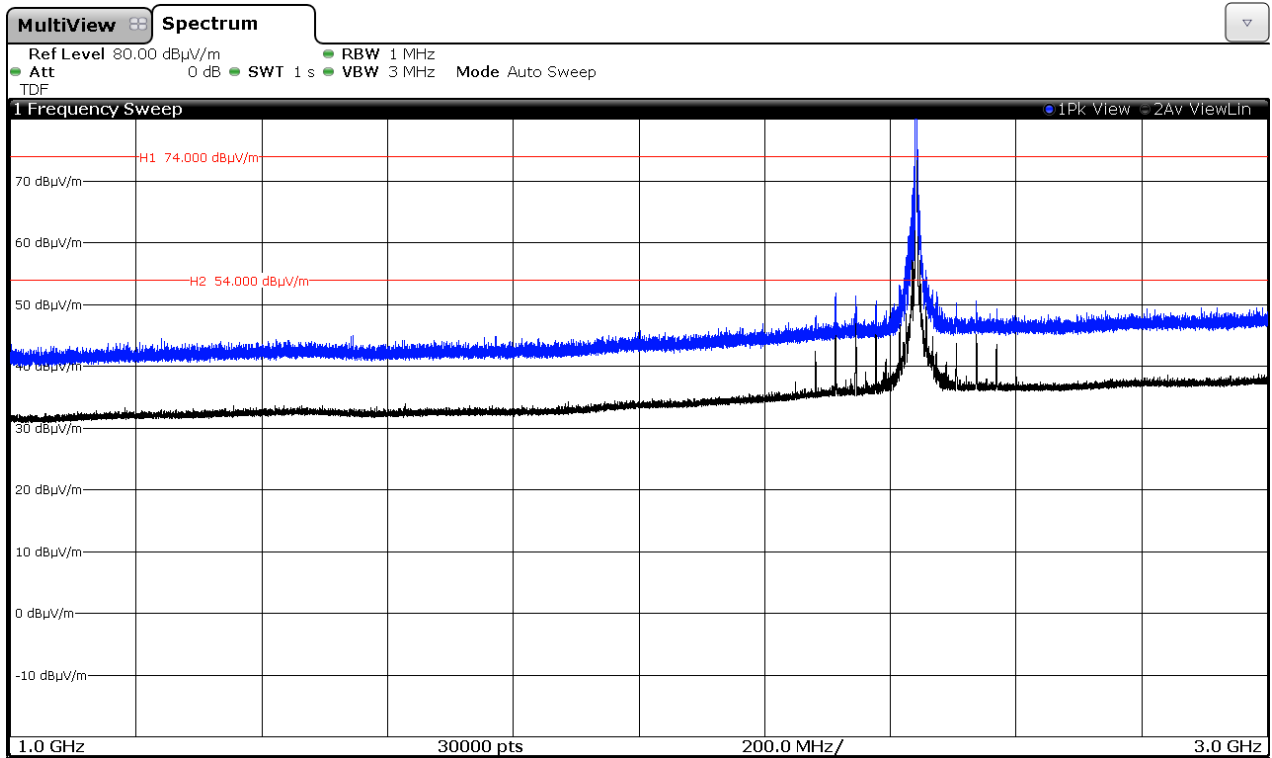
FREQUENCY RANGE 1 GHz to 3 GHz.

CHANNEL: Lowest (2402 MHz).



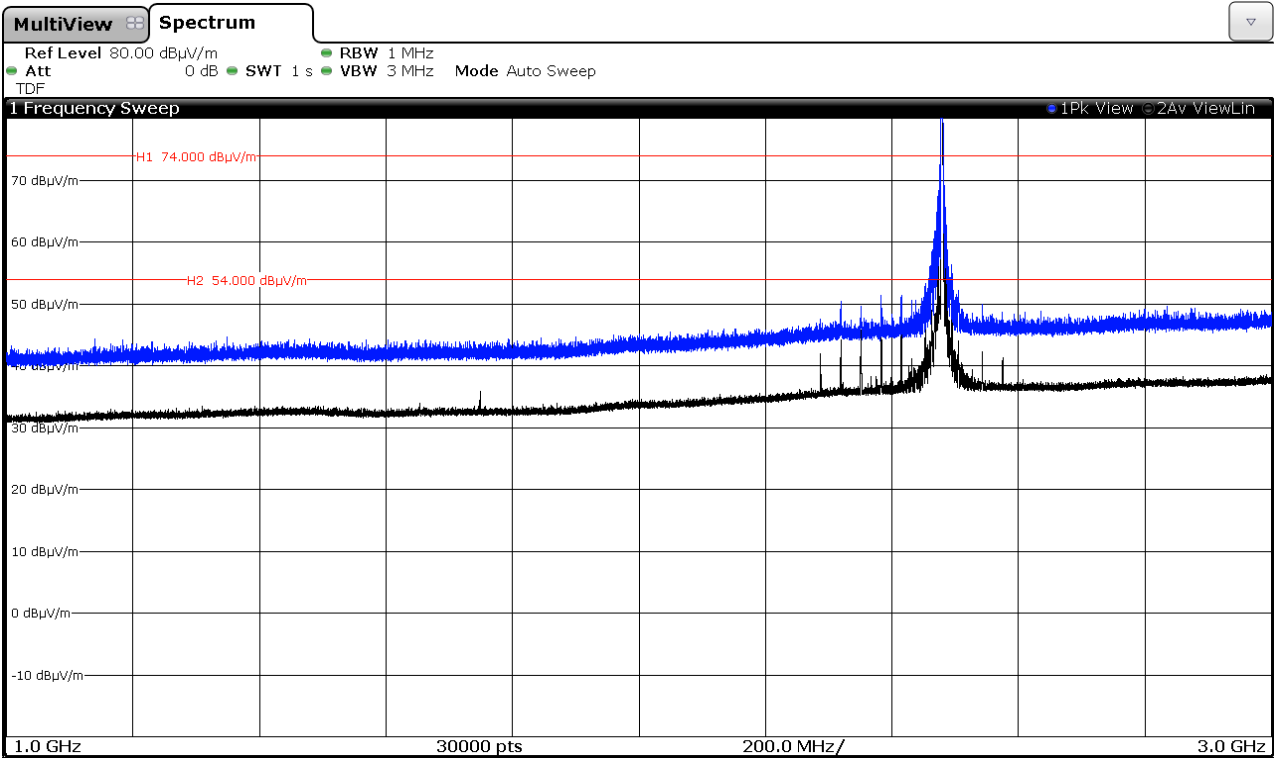
Note: The peak shown in the plot above the limits is the carrier frequency.

CHANNEL: Middle (2441 MHz).



Note: The peak shown in the plot above the limits is the carrier frequency.

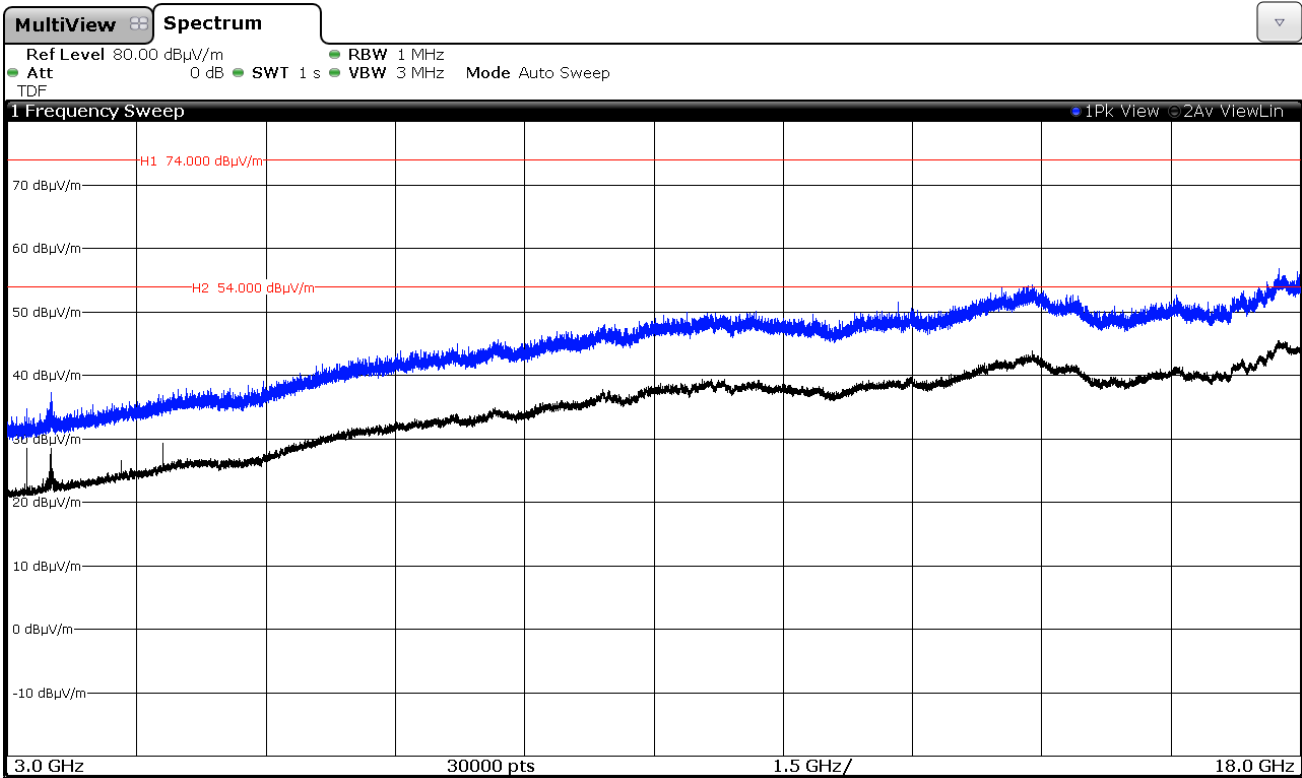
CHANNEL: Highest (2479 MHz).



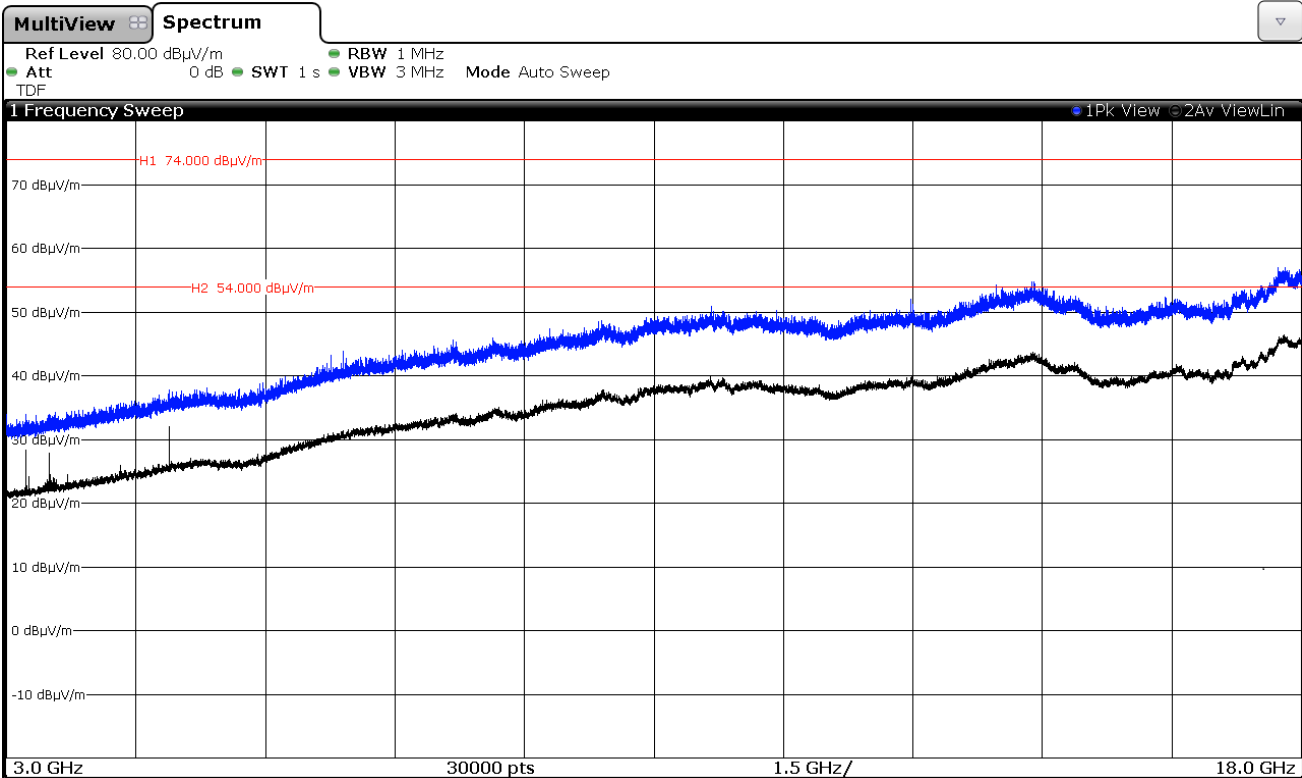
Note: The peak shown in the plot above the limits is the carrier frequency.

FREQUENCY RANGE 3 GHz to 18 GHz.

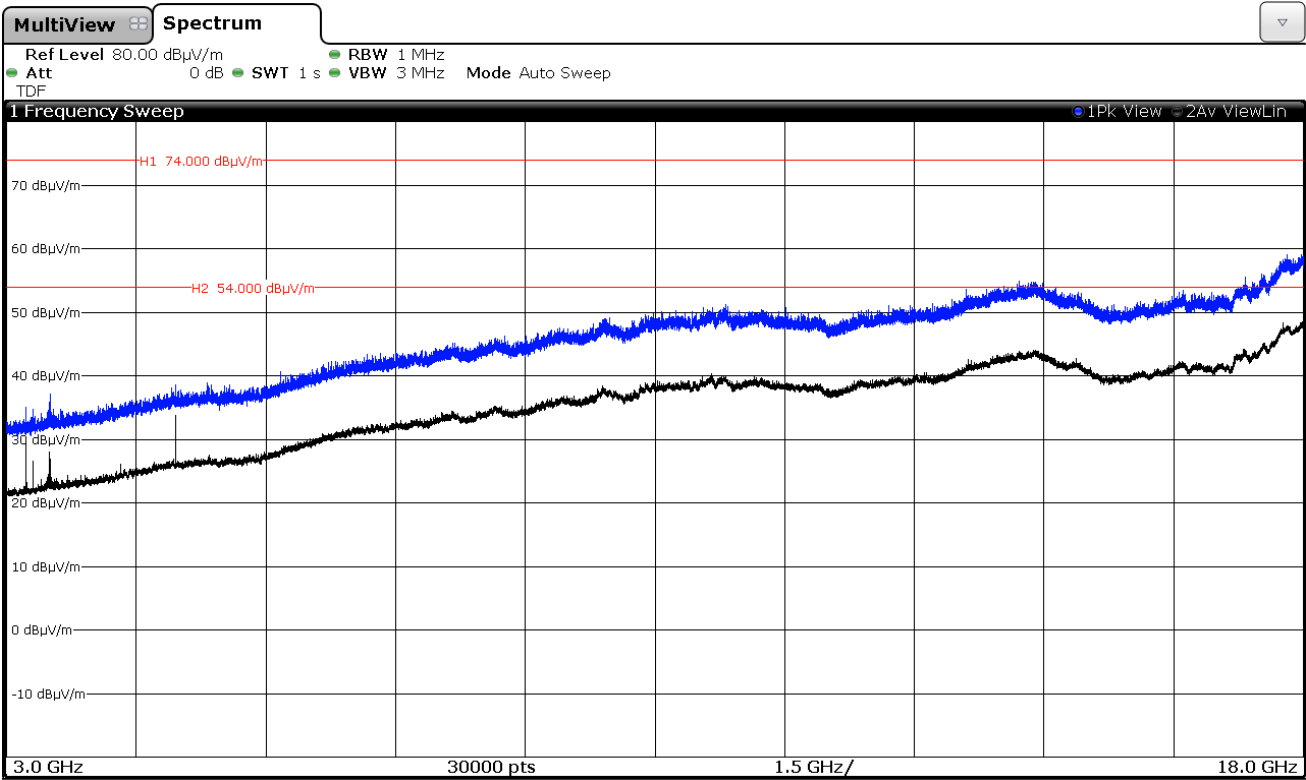
CHANNEL: Lowest (2402 MHz).



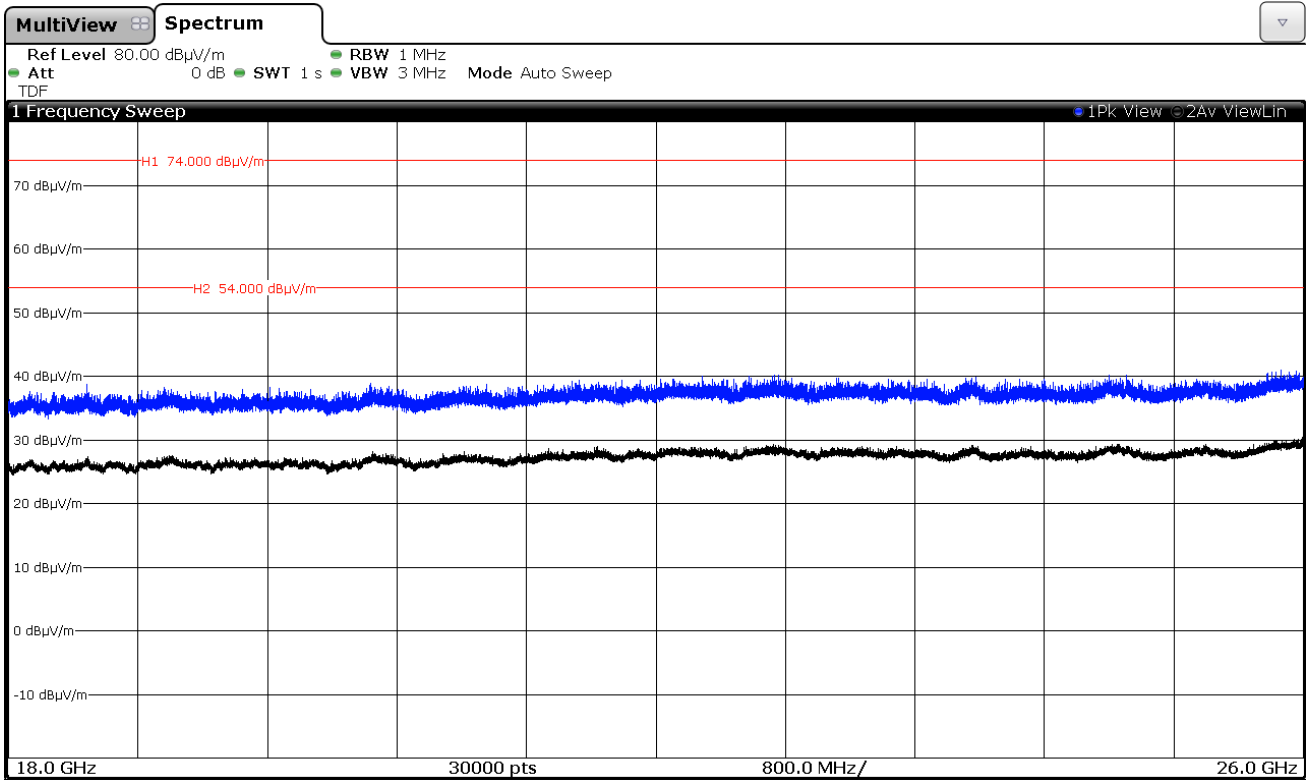
CHANNEL: Middle (2441 MHz).



CHANNEL: Highest (2479 MHz).



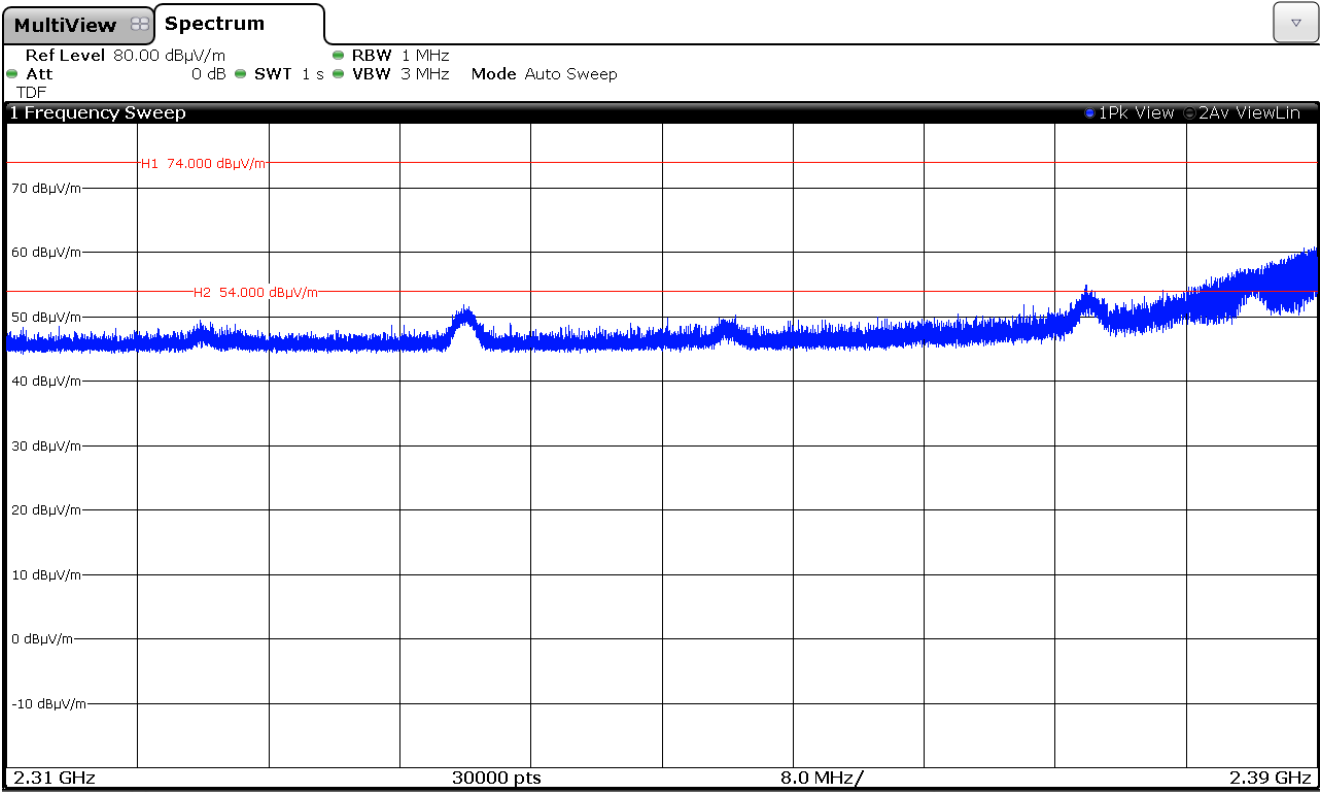
FREQUENCY RANGE 18 GHz to 26 GHz.



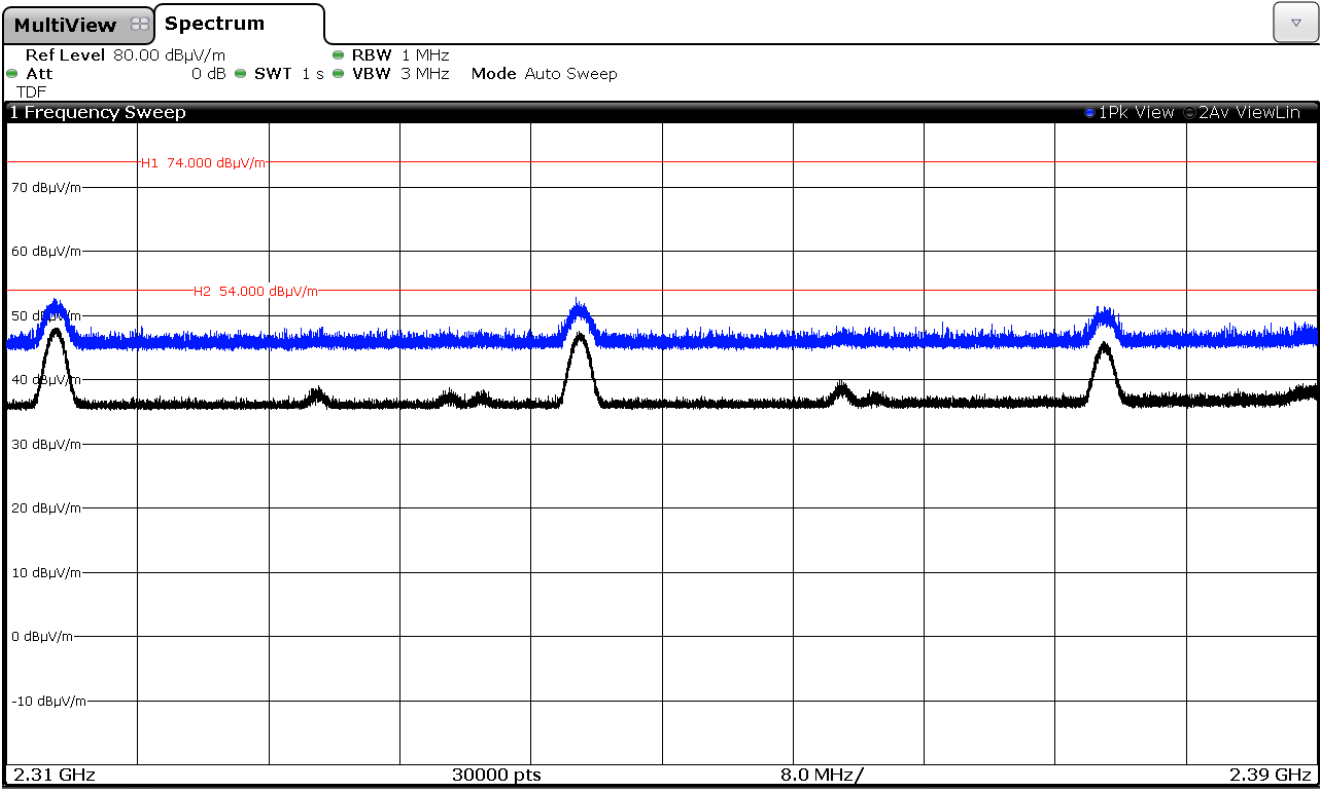
(This plot is valid for all three channels).

FREQUENCY RANGE 2.31 GHz to 2.39 GHz. (RESTRICTED BAND)

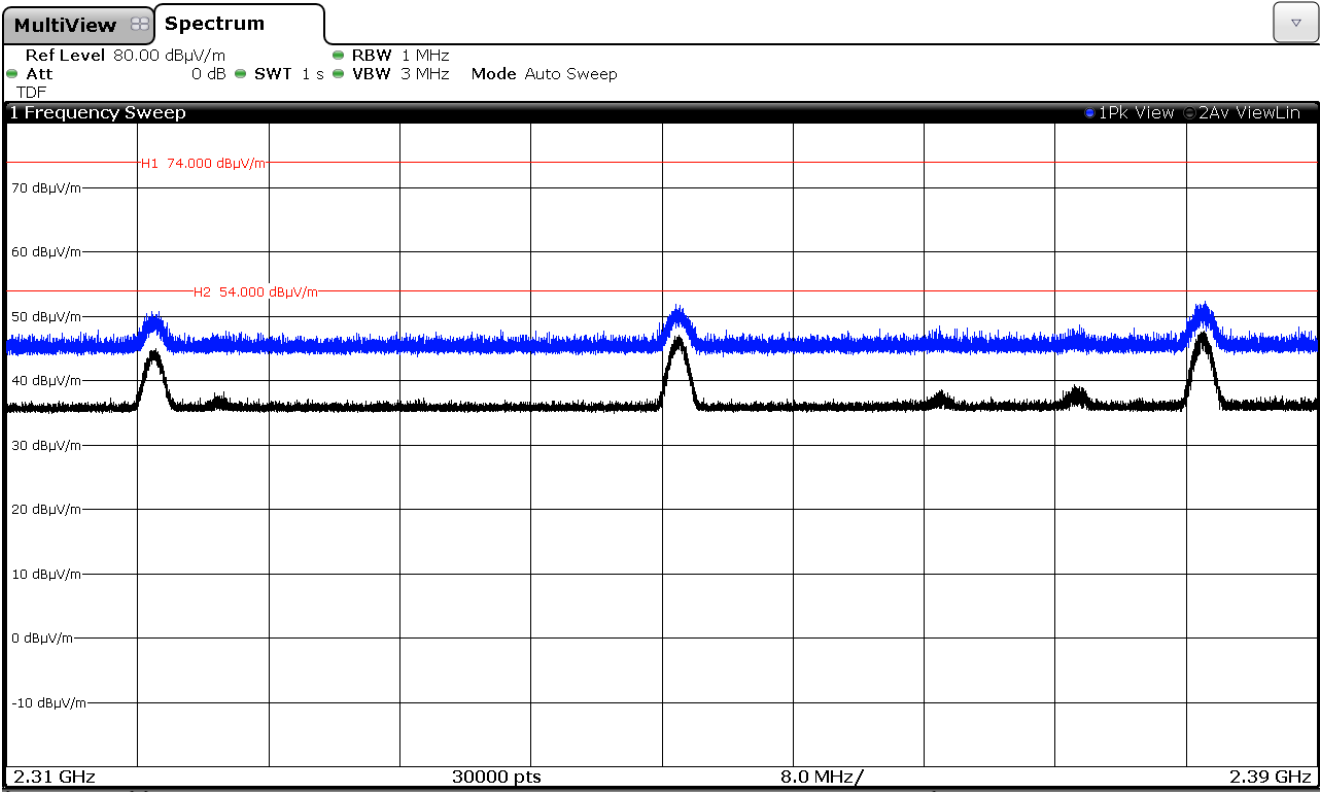
CHANNEL: Lowest



CHANNEL: Middle

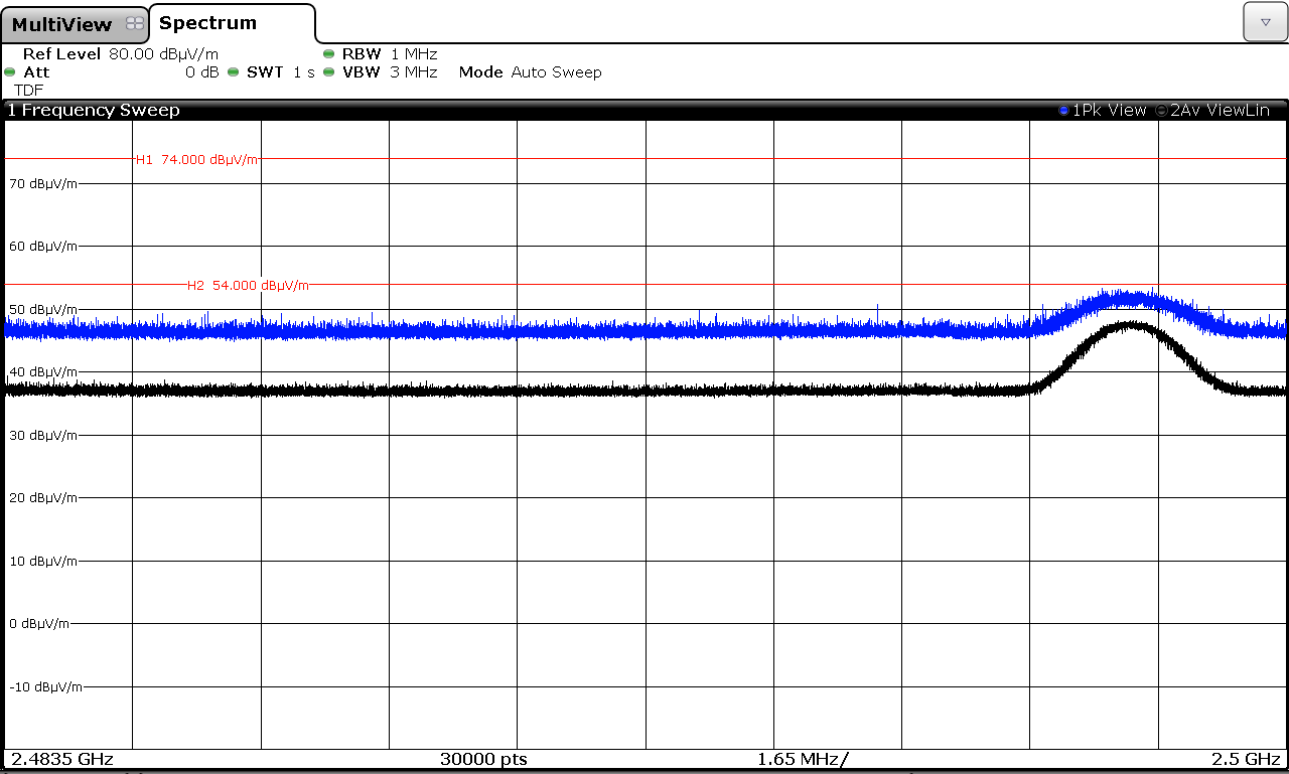


CHANNEL: Highest

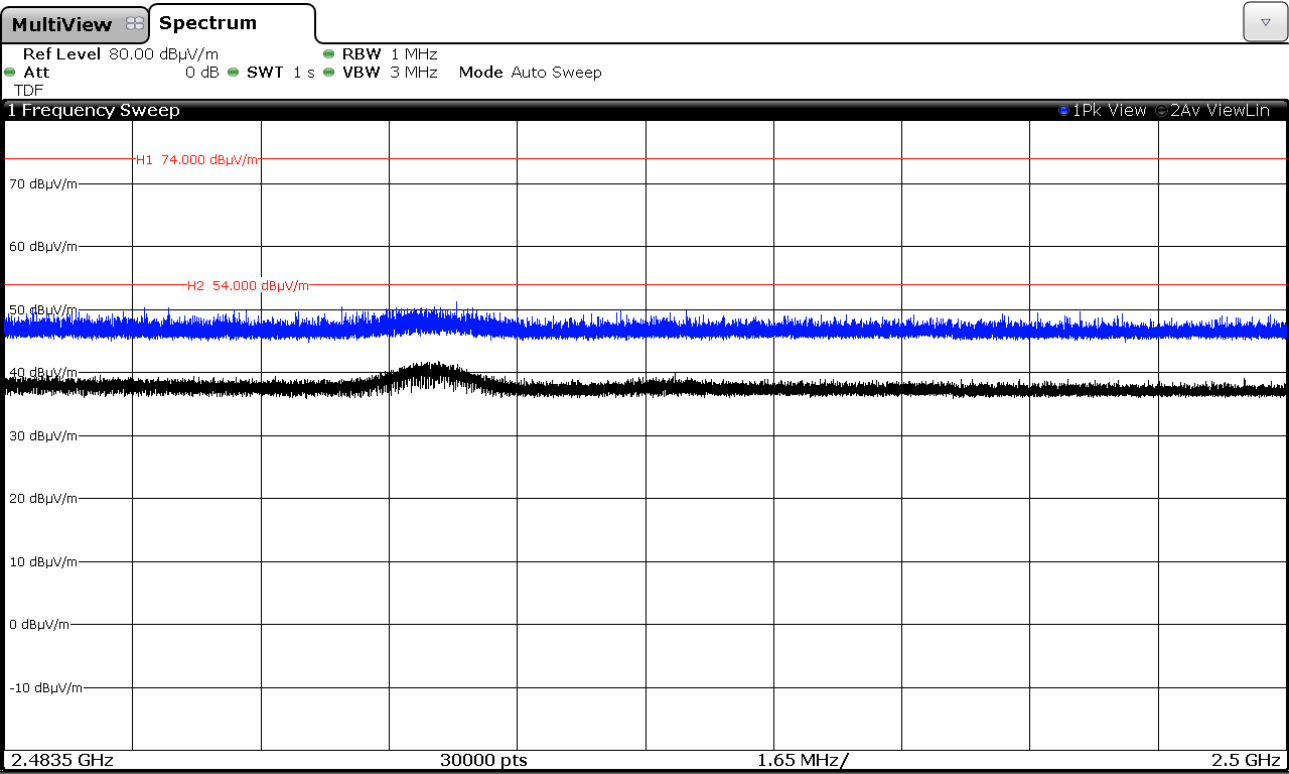


FREQUENCY RANGE 2.4835 GHz to 2.5 GHz. (RESTRICTED BAND)

CHANNEL: Lowest



CHANNEL: Middle



CHANNEL: Highest

